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ORIGINAL ARTICLE

Stressors Associated with Tobacco Use Among Trans Women

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Abstract

Purpose: Tobacco use is prevalent among sexual and gender minorities (SGM), yet few studies have examined the specific drivers of tobacco use among trans women. The purpose of this study is to examine the impact of proximal, distal, and structural stressors associated with tobacco use among trans women.

Methods: This study is based on a cross-sectional sample of trans women ($n = 162$) living in Chicago and Atlanta. Analyses were conducted to examine the association between stressors, protective factors, and tobacco use using a structural equation modeling framework. Proximal stressors (transgender roles scale, transgender congruence scale, internalized stigma, and internalized moral acceptability) were operationalized as a higher order latent factor, while distal stressors were operationalized as observed variables (discrimination, intimate partner violence, sex work, rape, child sexual abuse, HIV, and violence). Protective factors included social support, trans-related family support, and trans-related peer support. All analyses adjusted for sociodemographic variables (age, race/ethnicity, education, homelessness and health insurance).

Results: The prevalence of smoking among trans women in this study was 42.9%. In the final model, homelessness (odds ratio [OR]: 3.78; 95% confidence interval [CI]: 1.97, 7.25), intimate partner violence (OR: 2.14; 95% CI: 1.07, 4.28), and commercial sex work (OR: 2.22; 95% CI: 1.09, 4.56) were all associated with tobacco use. There was no association between proximal stressors and tobacco use.

Conclusion: Among trans women, tobacco use prevalence was high. Tobacco use was associated with homelessness, intimate partner violence, and commercial sex work. Targeted tobacco cessation programs should account for the co-occurring stressors that trans women face.

Keywords: discrimination; minority stress theory; stigma; tobacco use; transgender women; violence

Introduction

Tobacco use, the leading cause of preventable death in the United States,[1] disproportionately affects the health and quality of life of gender minorities.[2] Some research has demonstrated that smoking prevalence is higher among gender minorities compared with cisgender individuals[3,4] or sexual minorities.[4] Trans women are especially impacted, with estimates suggesting they smoke more cigarettes per day compared with other gender minorities.[2,5] Prevalence of smoking among trans women ranges from 31% to 83%.[6,7] Trans women are more susceptible to adverse consequences to cardiovascular health from smoking if they are on hormone replacement therapy because smoking while taking estrogen substantially increases risk of heart disease, stroke, and blood clots.[8]

Trans women living with HIV are at particular risk from the adverse consequences of smoking. For

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example, research has shown that having HIV increases the synergistic risk of mortality and morbidity associated with smoking[9–11] and that trans women experience disproportionately high rates of HIV, ranging from about 16% to 57%.[12,13] People living with HIV who smoke have a much higher risk of dying from smoking-related causes than from HIV alone.[10,14]

Trans women face unique stressors, such as gender-related discrimination and harassment that can result in maladaptive coping behaviors, including smoking. These stressors may impede efforts directed toward smoking cessation, and they may substantially worsen mental health and quality of life.[15] Besides smoking,[7] these unique stressors related to their gender identity/expression are associated with other adverse health behaviors and outcomes, including disordered eating,[16] substance use,[17,18] depression,[19] and suicidal behaviors.[20,21]

Minority stress theory (MST) is a useful framework for examining the mechanisms between these stressors and smoking among trans women.[7,22–26] Structural-level factors, such as unemployment, homelessness, and lack of access to health care and services disproportionately affect gender minorities, especially trans women.

In addition to these structural factors, distal and proximal stressors also exacerbate negative health outcomes for trans women. Distal stressors refer to external events and include instances of discrimination, including trans-related discrimination, violence, and microaggressions,[7,22–26] whereas proximal stressors refer to negative internalized perceptions and include internalization of negative gender identity perceptions, expectations of rejection, and concealing a stigmatized identity.

Among many trans women, experiences with these stressors can trigger smoking and impede efforts to quit.[7] In one study, 62.3% of trans women smoked daily and more than half reported unsuccessful quit attempts.[7] Experiencing discrimination was associated with unsuccessful quit attempts and never attempting to quit.[7] In a nationally representative sample of transgender individuals, those who experienced structural discrimination were more likely to smoke.[27]

Concealment of stigmatized identity, a proximal stressor, may be particularly important. In one study, concealment was associated with increased risk of smoking among transgender individuals in a nationally representative sample.[28] Among transgender youth, waiting a long period of time until gender-affirming medical interventions were begun was associated with an increased odds of lifetime smoking and current smoking.[28] Another study of gender and sexual minorities found that smoking was conceptualized as a socialization behavior and a coping technique for facing trans-related identity stress.[29] Living with HIV, another proximal stressor, has also been linked to smoking behaviors among transgender women.[7,30]

Structural-level stressors, such as education and housing stability, have also been examined as risk factors for smoking among trans women. For instance, trans women who reported attending some college, having a college degree, or having a graduate degree were less likely to smoke compared with those with less education.[27,30] Homelessness has also been associated with smoking among trans women.[30]

Identifying protective factors against smoking among trans women could be useful for guiding intervention development. A recent systematic review reported that protective factors such as social support, efficient coping mechanisms, and community connectedness were all associated with reduced odds of poor mental health outcomes among transgender individuals.[31] While social support has been a strong driver of positive health behaviors for trans women,[32,33] there is a lack of research examining social support in the context of tobacco use specifically among trans women.

The purpose of this study was to expand on previous work by examining a wider range of proximal and distal stressors associated with tobacco use among trans women.[7,30] Although trans women experience substantially high rates of violence and child abuse, to our knowledge these experiences have not been examined specifically in relation to tobacco use in this population.[34] Guided by the MST framework, the research questions for the current study were: (1) What are the structural, proximal, and distal stressors associated with tobacco use among trans women? and (2) What are the protective factors associated with tobacco use among trans women?

Methods

Participants and procedures

This study is a secondary data analysis of a cross-sectional survey among trans women. The initial aim of this study was to identify HIV-related risk behaviors among trans women in two urban centers, Atlanta, Georgia and Chicago, Illinois. Trans women were recruited from multiple venues and community-based outreach strategies. Data for the Atlanta project (the Transgender Atlanta Personal Survey) were collected between August 2014 and June 2015. The Chicago

study performed data collection between April and October 2017. Other details of study methodology are documented elsewhere.[35]

Inclusion criteria for the original study were: (1) age 18–65 years, (2) male sex assigned at birth and self-identifying as a female, transgender person, or other noncisgender identities, and (3) reporting anal sex with a cisgender male partner or a nontransgender male partner in the past 6 months.[35] All participants provided written informed consent after being screened for eligibility. Face-to-face structured interviews were conducted among trained specialists who were instructed to be nonjudgmental and use affirming language. The Georgia State University Institutional Review Board approved this project.

Measures

Demographics.

Demographic measures included age, race (Black/African American or Other), education (high school or less, some college or higher), employment status, homelessness (ever homeless), and whether the participant had health insurance. Tobacco use was operationalized as daily smoking using the question, "Do you smoke tobacco products on a daily basis?" (Yes/No).

Distal stressors—violence, sex work, and HIV.

As part of MST, distal and proximal stressors were included. Distal stressors included ever experiencing intimate partner violence (Yes/No), participating in commercial sex work (Yes/No), experienced childhood sexual abuse (Yes/No), ever experienced rape (Yes/No), and HIV status (Positive/Negative).

Trans-related violence was operationalized using three measures: harassment by a stranger ("Have you ever been verbally abused or harassed by a stranger in public because of your gender identity or presentation?"), harassment by family/friend ("Have you ever been verbally abused or harassed by a family member or friend because of your gender identity or presentation?"), and harassment by a partner ("Have you ever been physically abused or beaten by a romantic or sexual partner because of your gender identity?"). These measures were also conceptualized as a summative measure, and participants each received a "1" for each trans-related violence experience they reported (range 0–3).

Distal stressors—trans-related discrimination.

Another distal stressor included trans-related discrimination, which consisted of three different categories of measures: avoided activities due to discrimination, experienced police discrimination, and experienced work discrimination. Additionally, trans-related discrimination was computed as a summative measure, with each item counting as a "1" for participants who reported experiencing the discrimination event.

Proximal stressors.

Proximal stressors included the psychosocial impact of gender status, comfort with gender identity, assuming transgender roles, internalized trans-related stigma, internalized trans-related moral acceptability, perceived stress, and the desire for gender-affirming medical care.

Proximal stressors—psychosocial impact of gender status.

Psychosocial impact of gender status was assessed using a four-item subscale, which assessed four aspects of mental health that may be impacted by gender identity.[36] Items included "I get depressed about my gender status," "My gender status interferes with my quality of life," "I have thought about suicide because of my gender status," and "Being transgender causes me relationship problems." Items were summed, which ranged from 4 to 20 (range from 1 "strongly disagree" to 5 "strongly agree").

Proximal stressor—comfort with gender identity.

Comfort with gender identity was assessed using 12 items, which ask about happiness and satisfaction with gender identity and physical appearance. Items were coded such that higher scores corresponded to a positive perception of gender identity.

Proximal stressor—assuming transgender roles.

Assuming transgender roles utilized 18 items, which assessed scenarios and comfort with assuming the individual's role as a woman. These items also used a 5-point Likert scale ranging from "1" strongly agree to "5" strongly disagree and summed so that higher scores corresponded to a positive perception of assuming transgender roles (ranging from 18 to 90).

Proximal stressor—internalized trans-related stigma.

Internalized trans-related stigma assessed the perceptions of stigma against transgender women and included six items. Items were summed and higher scores indicated more negative perceptions of trans-related stigma (ranging from 6 to 30).

Proximal stressor—internalized trans-related moral acceptability. Internalized trans-related moral acceptability was operationalized using four items, which assessed the internalized morality of being transgender. Items were summed and higher scores indicated more positive perceptions of trans-related moral acceptability (ranging from 4 to 20).

Protective factors—social support. Protective factors included measures of perceived social support, trans-related family support, and trans-related peer support. The overall perceived social support measure consists of 10 questions with Likert-scale responses and statements, including, "There is a special person who is around when I am in need" and "There is a special person in my life who cares about my feelings." Trans-related family support consisted of two questions, "How supportive do you feel your family of origin (parents and/or siblings) is regarding your gender identity?" and "How supportive do you feel your immediate family (partner, children, etc.) is regarding your gender identity?"

Responses to these questions were measured using Likert-scale responses and ranged from "Not at all supportive" to "Extremely Supportive." Trans-related peer support consisted of two questions, "What portion of your social time is spent with transgender people?" and "How often have you felt like you were the only transgender person in the area where you live?" Responses to these two questions were also measured on a Likert scale and ranged from "Not at all/none at all" to "All of the time." The second question for trans-related peer support was reverse coded so that higher scores for trans-related peer support reflect higher levels of endorsed social support.

Data analyses

Descriptive statistics were used to characterize the sample in terms of sociodemographic characteristics, distal and proximal stressors, and social support measures, both overall and separately by tobacco use status.

Structural equation modeling was used to determine the associations between sociodemographic factors, distal and proximal stressors, and social support with the odds of tobacco use. A higher order latent factor model was built first for proximal stressors, which included the first-order latent variables for each subscale. Individual observed items were statistically and substantively evaluated for model fit, and several measures were excluded based on these criteria. Once each measurement model for the subscales was determined to have satisfactory model fit, the subscales were analyzed as a "proximal stressor" higher order latent variable.

Psychological impact of gender status resulted in poor fit for the model and was eventually removed from the proximal stressor latent variable. The final latent factors that comprised proximal stressors included: the transgender congruence scale, assuming transgender roles, internalized trans-related stigma, and internalized trans-related moral acceptability.

The other measures were included in the model as observed variables, including sociodemographic factors (age, race, education, homelessness, health insurance), distal stressors (experiencing IPV, reporting commercial sex work, rape, childhood sexual abuse, HIV status, the trans-related violence sum, and the trans-related discrimination sum), and social support (perceived social support, trans-related family support, and trans-related peer support). The final model was estimated simultaneously (Fig. 1). All analyses were conducted in R 3.5.3 and Mplus version 8.3.

Results

Among all participants ($n = 162$), the prevalence of daily tobacco smoking was 42.9%, and among the smokers, the majority reported using cigarettes (91.3%) (Table 1). Tobacco users also had a higher prevalence of reporting most of the distal stressors (IPV, commercial sex work, childhood sexual abuse, rape, HIV status, trans-related violence, and trans-related discrimination pertaining to police and general activities) compared with nontobacco users (Appendix Table A1).

In terms of the proximal stressors, trans women who reported tobacco use had lower scores on comfort with gender identity (transgender congruence scale), assuming transgender roles, and internalized trans-related moral acceptability compared with trans women who reported no tobacco use. The psychosocial impact of gender status and the internalized trans-related stigma were similar for both tobacco users and nontobacco users. Overall, social support was much lower for trans women who reported tobacco use (20.26) compared with trans women who reported no tobacco use (26.22).

Appendix Table A2 presents the results from the higher order latent factor model, proximal stressors, and the first-order latent factors, which was comprised of the subscales. The transgender congruence scale and the Transgender Roles Scale had a mediocre fit, while the internalized trans-related moral acceptability scale resulted in excellent model fit.

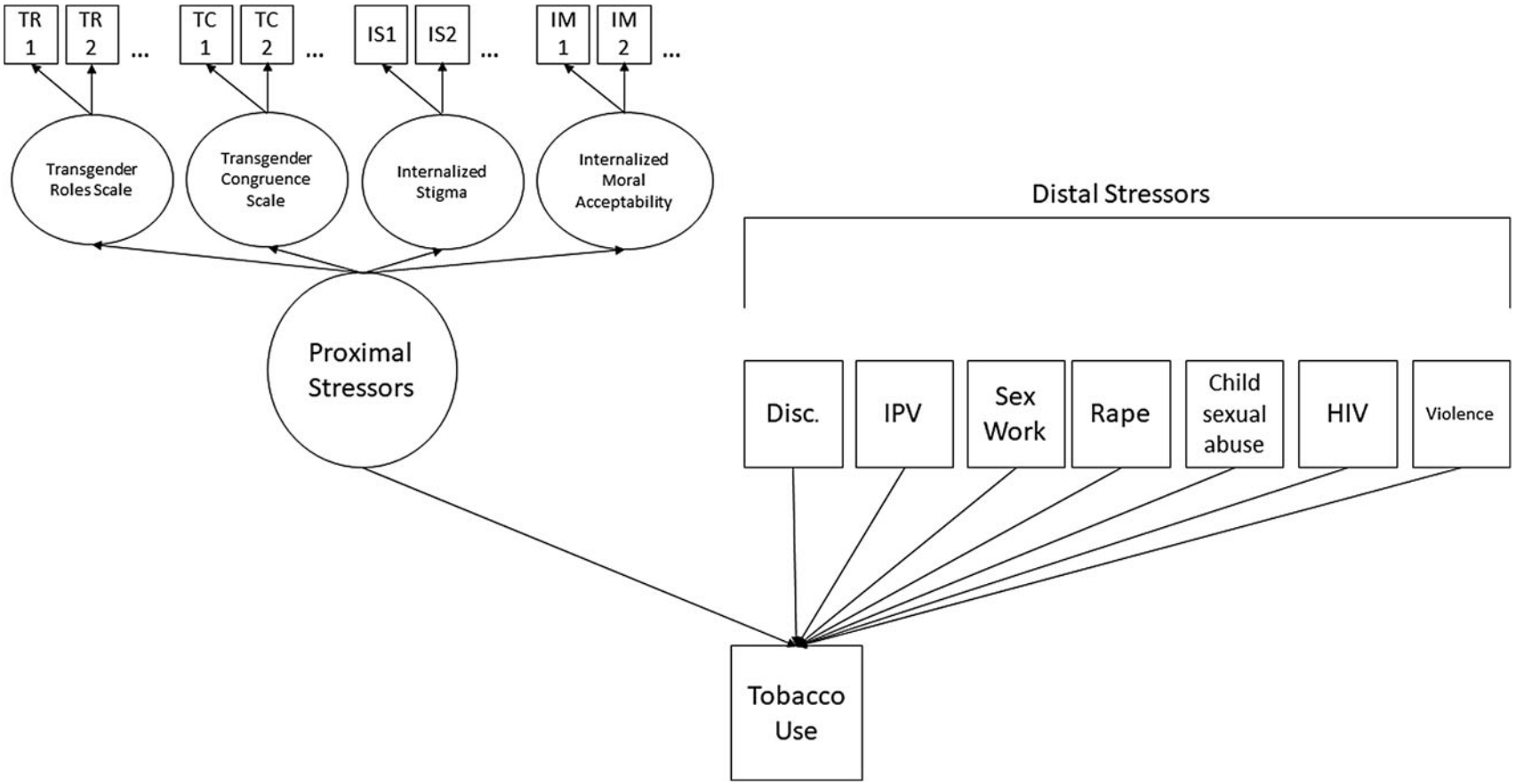

FIG. 1. Diagram of the associations between distal and proximal stressors with tobacco use among transgender women. Note. Model also includes observed variables: sociodemographic variables (age, race, education, homelessness, health insurance) and social support. Disc, discrimination.

Table 1. Demographic Characteristics, Distal and Proximal Stressors, and Social Support Among Transgender Women, Overall and by Tobacco Use Status (*n*=162)

	Tobacco use: no (*n*=93) 57.1%	Tobacco use: yes (*n*=69) 42.9%	Total
Demographic factors			
Age, *M* (SD)	30.73 (10.43)	31.23 (10.14)	30.94 (10.28)
Race			
Black/African American	80 (87.0%)	58 (84.1%)	138 (85.7%)
Other (including White)	12 (13.0%)	11 (15.9%)	23 (14.3%)
Education			
High school or less	44 (48.9%)	44 (63.8%)	88 (55.3%)
Some college or higher	46 (51.1%)	25 (36.2%)	71 (44.7%)
Employed			
No	22 (23.9%)	11 (15.9%)	33 (20.5%)
Yes	70 (76.1%)	58 (84.1%)	128 (79.5%)
Homelessness (past year)			
No	65 (71.4%)	23 (33.3%)	88 (55.0%)
Yes	26 (28.6%)	46 (66.7%)	72 (45.0%)
Health insurance			
No	34 (37.0%)	27 (39.1%)	61 (37.9%)
Yes	58 (63.0%)	42 (60.9%)	100 (62.1%)

M, mean; SD, standard deviation.

Table 2. Associations Between Transgender-Related Violence and Discrimination with Smoking Status Among Transgender Women Across Two U.S. Urban Areas (*n*=162)

	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Demographic factors		
Age	1.00 (0.97–1.04)	1.00 (0.97–1.03)
Race		
Black/African American	Reference	Reference
Other (including White)	1.26 (0.51–3.08)	0.97 (0.30–3.12)
Education		
High school or less	Reference	Reference
Some college or higher	0.54 (0.28–1.03)	0.58 (0.30–1.13)
Homeless		
No	Reference	Reference
Yes	**5.00 (2.57–9.99)**	**3.78 (1.97–7.25)**
Health insurance		
No	Reference	Reference
Yes	0.91 (0.48–1.74)	0.99 (0.49–2.01)
Distal stressors		
IPV ever		
No	Reference	Reference
Yes	**2.22 (1.17–4.24)**	**2.14 (1.07–4.28)**
Commercial sex work		
No	Reference	Reference
Yes	**2.45 (1.28–4.84)**	**2.22 (1.09–4.56)**
Experienced rape		
No	Reference	Reference
Yes	**2.18 (1.14–4.25)**	1.27 (0.58–2.80)
Childhood sexual abuse		
No	Reference	Reference
Yes	**1.97 (1.04–3.78)**	0.89 (0.38–2.09)
HIV		
Negative	Reference	Reference
Positive	**2.92 (1.48–5.87)**	1.76 (0.87–3.58)
Total trans-related discrimination sum	1.02 (0.96–1.09)	1.00 (0.93–1.07)
Total trans-related violence sum	1.25 (0.92–1.72)	1.04 (0.70–1.52)
Proximal stressors		
Proximal latent factor	0.67 (0.42–1.08)	0.89 (0.52–1.54)
Social support		
Perceived social support	0.99 (0.98–1.00)	1.00 (0.99–1.01)
Trans-related family support	0.99 (0.92–1.08)	1.03 (0.93–1.14)
Trans-related peer support	1.08 (0.96–1.22)	1.05 (0.92–1.20)

Statistically significant associations are bolded.
Trans-violence sum measure includes harassment by a stranger, harassment by a friend, and assault by a partner (range 0–3).
CI, confidence interval; IPV, intimate partner violence; OR, odds ratio.

Table 2 presents the unadjusted and adjusted odds ratios (ORs) for tobacco use among the predictors. Homelessness (OR: 5.00; 95% confidence interval [CI]: 2.57, 9.99), intimate partner violence (OR: 2.22; 95% CI: 1.17, 4.24), commercial sex work (OR: 2.45; 95% CI: 1.28, 4.84), experienced rape (OR: 2.18; 95% CI: 1.14, 4.25), childhood sexual abuse (OR: 1.97; 95% CI: 1.04, 3.78), and HIV (OR: 2.92; 95% CI: 1.48, 5.87) were all associated with tobacco use in the bivariate associations. In the multivariable model, homelessness (OR: 3.78; 95% CI: 1.97, 7.25), intimate partner violence (OR: 2.14; 95% CI: 1.07, 4.28), and commercial sex work (OR: 2.22; 95% CI: 1.09, 4.56) were all associated with tobacco use, after adjusting for all other variables in the model.

Discussion

We observed a 42.9% prevalence of tobacco use among trans women, which is similar to previous tobacco use estimates among trans women.[6,7] This prevalence is nearly three times higher than the general U.S. adult smoking prevalence (13.7%).[37] It is clear that culturally appropriate, effective tobacco cessation interventions and prevention initiatives are warranted for trans women.

In the current study, we found that homelessness, commercial sex work, and experiencing intimate partner violence were all associated with tobacco use among trans women. Therefore, the factors associated with tobacco use in our study included both structural/sociodemographic (homelessness) factors and distal stressors (commercial sex work and intimate partner violence).

We did not find an association between proximal stressors (i.e., psychosocial impact of gender status, comfort with gender identity, assuming transgender roles, internalized trans-related stigma, and internalized trans-related moral acceptability) and tobacco use in the bivariate nor the multivariable analyses. This is surprising as previous studies have found that proximal stressors are strongly linked to substance use among transgender individuals.[38,39] This may be indicative of a resiliency effect specifically among trans women, and future studies should investigate mechanisms of resilience against smoking in this population.

Similarly to our findings, Lee and colleagues found that smoking was not associated with the typical theoretical stressors among LGBTQ individuals, such as stigma and discrimination.[40] Rather, Lee et al. recommended that smoking cessation interventions for LGBTQ individuals focus on increasing social support and addressing social norms, rather than the traditional theoretical stressors.[40] While we did not find an association between social support and tobacco use in our multivariable analysis, we did find that trans women who reported tobacco use also reported lower social support compared with trans women who did not use tobacco, which also aligns with the study by Lee and colleagues.[40]

As mentioned previously, homelessness, a structural/sociodemographic factor, was associated with higher odds of tobacco use in our study, consistent with other research.[27,30] Housing stability is a serious concern among trans women, with 44.4% of trans women in our sample reporting previously or currently being homeless.

The prevalence of homelessness in the current study among trans women is slightly higher than prevalence estimates of homelessness among LGBT persons (20–40%).[41] Poverty, racism, substance use, and mental health issues all contribute to homelessness among LGBT persons.[41] Co-occurring substance use coupled with systemic racism and inequities consistently reinforce homelessness and housing instability among trans women of color.[41,42] These stressors may partly explain the strong association found in this study between homelessness and smoking.

The smoking prevalence among the general population of homeless U.S. adults is also high, with some estimates as high as 73%.[43] Tobacco cessation interventions for other populations of adults experiencing homelessness could potentially be adapted specifically for trans women, but more research is needed.[44] Future studies should also assess whether providing housing stability for trans women may lessen the impact of homelessness on smoking and substance use.[42]

Intimate partner violence, a distal stressor, was the only violence measure that was associated with tobacco use in the multivariable analysis. However, most of the violence measures in this study, including intimate partner violence, childhood sexual abuse, and previously being raped, were significantly associated with tobacco use in the bivariate analyses. A recent meta-analysis reported that transgender individuals were 1.7 times more likely to report intimate partner violence compared with cisgender individuals.[45] The association between violence and smoking is not new,[46–48] however, it is clear these stressors are highly prevalent among trans women and may also be significant drivers for smoking behaviors for trans women.

Commercial sex work was another distal stressor associated with tobacco use in our multivariable analyses.

Many studies have shown a link between sex work and substance use among transgender women,[49–51] however, previous research did not find an association between sex work and smoking among trans women.[7] The current study found that commercial sex work was associated with smoking, even after adjusting for other important covariates. Transgender women who engage in sex work face multiple adversities, including high rates of HIV infection,[52] stigma, and violence,[53] all of which may contribute to stressors associated with smoking.

Although trans-related discrimination was not significantly associated with tobacco use in our multivariable model, at a univariate level, trans women who reported tobacco use also reported a significantly higher prevalence of trans-related discrimination compared with nontobacco users in our study. This is similar to a previous study by Gamarel and colleagues, which found that structural discrimination was associated with smoking among a nationally representative sample of trans women.[27]

Limitations

Several limitations should be noted. Since this study is cross-sectional, causation cannot be inferred. This study was also a secondary data analysis of a cross-sectional survey that primarily focused on HIV-related risk behaviors, and generalizability may be compromised. Additionally, most of the participants were referred to the study through community-based organizations and convenience sampling, which also may limit generalizability to trans women who do not have access to these organizations and services. The sample size ($n = 162$) also limits our power to detect small associations. Social desirability and recall bias may have also influenced participants' responses, particularly among sensitive topics and early childhood situations.

Lastly, the transgender congruence scale and transgender role scales exhibited a mediocre fit to the data, which may be indicative of an alternative latent factor in the population. Nevertheless, our study is strengthened by the focus on predominantly Black/African American trans women, who experience substantial health disparities compared with White trans women, including higher HIV rates.[12] This underserved population may benefit from interventions aimed at decreasing the substantial stressors faced and improving coping mechanisms, which may ultimately improve quality of life for Black/African American trans women.

Conclusion

Trans women have disproportionately high prevalence of tobacco use, which could be triggered and exacerbated by the substantial stressors that this population faces. Among trans women in our study, intimate partner violence, homelessness, and commercial sex work were all associated with higher odds of tobacco use. However, it is important to note that we did not find an association between proximal stressors, such as internalized trans-related stigma, and tobacco use. Future studies should examine factors influencing resiliency against smoking in this population. Overall, culturally appropriate and effective tobacco cessation interventions are urgently warranted for trans women, who face a substantial amount of co-occurring stressors and barriers to tobacco cessation.

Authors' Contributions

R.E.C. conceptualized the study, conducted the data analysis, and wrote the article. L.F.S. and R.C. contributed to data collection and the conceptualization of the original study. L.F.S. also contributed to the writing and editing of the article. C.A.S. contributed to writing and editing of the article. R.C. contributed to writing and editing of the article. M.J.H. contributed to conceptualization of the data analyses and writing and editing of the article. D.M.A. contributed to writing and editing of the article.

Author Disclosure Statement

No competing financial interests exist.

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Abbreviations Used

CI = confidence interval
CFI = comparative fit index
HRT = hormone replacement therapy
IPV = intimate partner violence
M = mean
MST = minority stress theory
OR = odds ratio
RMSEA = root mean square error of approximation
SD = standard deviation
SRMR = standardized root mean square residual.

Appendix

Appendix Table A1. Prevalence of Stressors and Social Support Among Transgender Women, Overall and by Tobacco Use Status (*n*=162)

	Tobacco use: no (*n*=93) 57.1%	Tobacco use: yes (*n*=69) 42.9%	Total
Distal stressors			
Intimate partner violence			
No	54 (59.3%)	27 (39.7%)	81 (50.9%)
Yes	37 (40.7%)	41 (60.3%)	78 (49.1%)
Commercial sex work			
No	46 (50.5%)	20 (29.4%)	66 (41.5%)
Yes	45 (49.5%)	48 (70.6%)	93 (58.5%)
Childhood sexual abuse			
No	56 (62.9%)	31 (46.3%)	87 (55.8%)
Yes	33 (37.1%)	36 (53.7%)	69 (44.2%)
Any rape			
No	45 (50.6%)	22 (31.9%)	67 (42.4%)
Yes	44 (49.4%)	47 (68.1%)	91 (57.6%)
HIV status			
Negative	51 (62.2%)	22 (36.1%)	73 (51.0%)
Positive	31 (37.8%)	39 (63.9%)	70 (49.0%)
Trans-violence—harassment by stranger			
No	35 (38.9%)	23 (33.3%)	58 (36.5%)
Yes	55 (61.1%)	46 (66.7%)	101 (63.5%)
Trans-violence—harassment by family/friend			
No	51 (56.0%)	32 (46.4%)	83 (51.9%)
Yes	40 (44.0%)	37 (53.6%)	77 (48.1%)
Trans-violence—assault by partner			
No	73 (81.1%)	50 (72.5%)	123 (77.4%)
Yes	17 (18.9%)	19 (27.5%)	36 (22.6%)
Sum of trans-violence events			
0	28 (31.1%)	14 (20.3%)	42 (26.4%)
1	22 (24.4%)	21 (30.4%)	43 (27.0%)
2	30 (33.3%)	21 (30.4%)	51 (32.1%)
3	10 (11.1%)	13 (18.8%)	23 (14.5%)
Trans discrimination—avoided activities due to discrimination			
No	29 (36.2%)	11 (20.0%)	40 (29.6%)
Yes	51 (63.7%)	44 (80.0%)	95 (70.4%)
Trans discrimination—experienced police discrimination			
No	46 (50.0%)	27 (39.1%)	73 (45.3%)
Yes	46 (50.0%)	42 (60.9%)	88 (54.7%)
Trans discrimination—experienced work discrimination			
No	15 (16.3%)	12 (17.4%)	27 (16.8%)
Yes	77 (83.7%)	57 (82.6%)	134 (83.2%)
Sum of total trans discrimination events, *M* (SD) range 0–25	6.18 (4.98)	6.82 (5.42)	6.45 (5.16)
Proximal stressors			
Psychosocial impact of gender status, *M* (SD)	13.82 (4.24)	13.49 (3.57)	13.68 (3.96)
Comfort with gender identity, *M* (SD) (transgender congruence scale)	47.60 (8.28)	46.09 (5.99)	46.95 (7.40)

(*continued*)

Appendix Table A1. (Continued)

	Tobacco use: no (*n*=93) 57.1%	Tobacco use: yes (*n*=69) 42.9%	Total
Assuming transgender roles, *M* (SD)	76.43 (11.67)	71.87 (13.26)	74.47 (12.55)
Internalized trans-related stigma, *M* (SD)	21.33 (4.40)	21.51 (3.77)	21.41 (4.13)
Internalized trans-related moral acceptability, *M* (SD)	15.16 (3.26)	14.86 (2.84)	15.03 (3.08)
Social support factors			
Perceived social support, *M* (SD) (range 7–84)	26.22 (31.88)	20.26 (28.60)	23.52 (30.53)
Trans family support, *M* (SD) (range 0–14)	9.55 (3.84)	9.46 (4.29)	9.51 (4.03)
Trans peer support, *M* (SD) (range 1–14)	7.35 (2.40)	7.87 (2.98)	7.57 (2.66)

M, mean; SD, standard deviation.

Appendix Table A2. Higher Order Latent Factor Model Fit for Proximal Stressors Among Transgender Women (*n*=162)

First-order latent factors	Estimate (95% CI)	Standardized estimate
Transgender congruence scale		
Model fit: RMSEA: 0.16, CFI: 0.83, SRMR: 0.07		
"I experience a sense of unity between my gender identity and my body"	1.00	0.56
"I am generally comfortable with how others perceive my gender identity when they look at me"	1.01 (0.75–1.27)	0.68
"My physical body represents my gender identity"	1.27 (0.96–1.57)	0.74
"My physical appearance adequately expresses my gender identity"	0.97 (0.71–1.23)	0.63
"I am happy with the way my appearance expresses my gender identity"	0.87 (0.63–1.11)	0.63
"I feel that my mind and body are consistent with one another"	1.09 (0.82–1.36)	0.75
"I am happy that I have the gender identity that I do"	0.84 (0.59–1.09)	0.56
"I have accepted my gender identity"	0.74 (0.53–0.95)	0.60
Transgender roles scale		
Model fit: RMSEA: 0.13, CFI: 0.76, SRMR: 0.08		
"I attend entertainment events in my feminine role or as my feminine self"	1.00	0.61
"I eat in restaurants in my feminine role or as my feminine self"	1.33 (1.06–1.60)	0.77
"I often shop appearing as a woman"	1.76 (1.42–2.10)	0.84
"I have traveled by airplane in my feminine role or as my feminine self"	1.68 (1.29–2.06)	0.66
"I have a driver's license with my feminine picture"	1.78 (1.32–2.23)	0.59
"I am able to pass in public places"	1.48 (1.18–1.78)	0.79
"My female name is now my legal name"	1.32 (0.83–1.81)	0.38
"I have checked into hotels or motels as a woman"	1.59 (1.22–1.97)	0.65
"I have taken train trips or public transportation as a woman"	1.68 (1.35–2.01)	0.83
"I have taken all-day auto or bus trips as a woman"	1.73 (1.40–2.06)	0.87
"As my feminine self, men have bought me drinks"	0.69 (0.40–0.98)	0.33
"I have been a student as a woman"	1.31 (0.88–1.74)	0.43
"I have developed a passable style of speaking as a woman"	1.03 (0.72–1.34)	0.48
"Relatives and friends know of my feminine identity"	1.15 (0.86–1.45)	0.58
"I have taken female hormones regularly"	1.55 (1.17–1.93)	0.61
"I have attended business meetings as a woman"	1.50 (1.13–1.87)	0.62
"In my feminine role or as my feminine self, I have danced with a man"	0.93 (0.65–1.21)	0.48
"I've discussed possible cosmetic surgery with a doctor"	1.12 (0.69–1.55)	0.36
Internalized trans-related stigma		
Model fit: just-identified		
"Society still punishes people for being transgender"	1.00	0.66
"Most people have negative reactions to transgender people"	0.96 (0.72–1.20)	0.65
"Discrimination against transgender people is still common"	1.20 (0.94–1.47)	0.83
Internalized trans-related moral acceptability		
Model fit: RMSEA: 0.05, CFI: 0.99, SRMR: 0.03		
"Being transgender is NOT against the will of God"	1.00	0.43
"Being transgender is morally acceptable"	1.14 (0.65–1.63)	0.54
"Being transgender is as natural as being born a man or woman"	1.36 (0.75–1.97)	0.67
"I object if any anti-trans joke is told in my presence"	1.09 (0.56–1.62)	0.48
Higher order latent factor proximal stressors		
Model fit: RMSEA: 0.10, CFI: 0.71, SRMR: 0.098		
Transgender congruence	1.00	0.72
Transgender roles	0.88 (0.57–1.19)	0.92
Internalized trans-related stigma	0.83 (0.52–1.14)	0.62
Internalized trans-related moral acceptability	0.68 (0.33–1.04)	0.63

Excluded measures for the transgender congruence scale included: "My outward appearance represents my gender identity"; "The way my body currently looks does NOT represent my gender identity"; "I do NOT feel that my appearance reflects my gender identity"; and "I am not proud of my gender identity." Excluded measures for the Internalized Trans-related Stigma scale included: "Only a few people discriminate against transgender people"; "I worry about becoming an old transgender woman"; and "I worry about becoming unattractive."

CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.